be made from ground nuts shelled in the country of production and exported in the form of kernels, the argument being that the oil in such kernels must always contain too much free fatty acid. It is clear from the French bulletin, however, that lack of tonnage, if nothing else, is now forcing French oil-seed crushers to reconsider this question and to find means of importing ground-nut kernels in good condition.

In a recent number (No. 86 of 1917) of *L'Expansion Coloniale* M. Emile Baillaud, to whose activity the Marseilles Colonial Institute owes much of its prestige in France, discusses the problems which these French committees on cereals and oil-seeds will take into consideration. From this it appears that the committees are faced with much the same problems as those mentioned in the first paragraph of this article, viz. that French, like British, manufacturers have not been able to take up new oil-seeds, but have largely left the initiative in such matters to Germany, and that they have not utilised and developed sources of supply in their own colonies. It will be the chief object of the committees to ascertain how this state of things can be remedied. It is interesting in this connection to note that M. Baillaud has a proper appreciation of the necessity for technical investigations, and suggests that the Committee on Oilseeds will require to initiate investigations similar to those carried on for some years past on the oil-palm by the Imperial Institute in this country in co-operation with the Departments of Agriculture in British West Africa.

NOTES.

As an outcome of the Departmental Committee on the Welfare of the Blind, which recently issued an excellent report, the President of the Local Government Board (Mr. W. Hayes Fisher) has appointed a Committee to advise the department on matters relating to the care and supervision of the blind. The selection of members appears to have been made with discretion, except that, as pointed out by "Ophthalmic Surgeon" in a letter to the *Times* of December 8, there is no medical man or ophthalmic surgeon upon the Committee. The original Committee had an ophthalmic surgeon among its number, and applied to the Royal Society of Medicine for assistance in its deliberations. A Sub-Committee of the Ophthalmological Section was appointed, and devoted much time and trouble to the subject. The report shows that it afforded very material help. Mr. Hayes Fisher, writing to the *Times* of December 11, excuses himself for the absence of any medical representation on the Advisory Committee by saying that "nine-tenths of the Committee's time will be taken up with the consideration of administrative problems," and that "under existing circumstances it would not be right to make a further demand upon the time of any of our eminent ophthalmic specialists, who are already so fully occupied." The courteous terms in which this letter is couched will doubtless be appreciated by the Royal Society of Medicine and the medical profession generally, but they do not succeed in masking the characteristic official attitude. Ophthalmic surgeons themselves are the best judges of the time which they have at their disposal, and the ordinary amenities of social life should have suggested that they at least should be consulted and offered the opportunity of giving their assistance when it is proposed to put their recommendations into action.

THE project, which has been in abeyance for some considerable time, for a ship canal across the Scottish isthmus lying between the Firth of Forth and the Firth of Clyde has lately been revived, partly in consequence of the direction of military opinion towards the strategical value of such a waterway in time of war, and partly also on account of the substantial commercial advantages which would accrue generally. A question on the subject was recently put in the House of Commons, and Dr. Addison, in reply, stated that the matter was under the consideration of the Department of Reconstruction in view of the opening afforded for the utilisation of the labour of demobilised men for the execution of the undertaking. We observe, in the issue of *The Engineer* of November 30, an interesting account of the inception and development of the underlying idea, which was promulgated, in the first instance, so far back as the year 1724 by Daniel Defoe. At present there are two schemes which have been elaborated. The first consists in linking up the rivers Forth and Clyde by the most direct route through the Kelvin valley. The second route, avoiding the congested district of the Upper Clyde, lies along the Forth valley, leaving the river channel near Alloa and ultimately reaching Loch Lomond by means of Endrick Water. A short auxiliary connection between Loch Lomond and Loch Long at Arrochar would then complete the passage to the sea. The broad difference between the two routes is that the Loch Lomond route would be at the loch level, while the direct route would be at the level of high water of spring tides. Exigencies of space forbid us to attempt even a summary of the relative advantages and difficulties of the rival schemes, each of which has its convinced supporters.

WE regret to learn that Dr. A. M. W. Downing, formerly superintendent of the "Nautical Almanac," died suddenly on Saturday, December 8, at sixty-seven years of age.

LADY ROBERTS's Field Glass Fund, which has now issued 30,000 instruments to the Army, has no funds beyond the sum necessary for returning the glasses to their owners when this is desired. The main expense is that of repairing the glasses which come back for re-issue. An appeal is made for the sum of 1000*l.* to meet the repairing bills, and the need justifies the request. The address for sending contributions (also any field-glasses and telescopes that can still be spared) is the Manager, Lady Roberts's Field Glass Fund, 64 Victoria Street, S.W.1.

THE Executive Committee of the Automobile Association has decided to offer a prize of 1000*l.* for the best invention which will enable coal-gas to be used with advantage as a propellant of motor-cars and motor-cycles. Communications relating to this subject should be addressed to the Secretary, Automobile Association and Motor Union, Fanum House, Whitcomb Street, W.C.2, and marked "Coal Gas."

IT was announced at the Linnean Society of London on November 29 that a new Linnean Society has been established recently in Sweden as "Svenska Linné-Sällskapet," intended as a means for spreading information about Sweden's greatest naturalist, Carl von Linné (1707–78). The society purposes to do this by publication of works by Linné and his pupils; to throw new light from modern viewpoints on Linné's personality; to draw up a catalogue of all known memorials; and to found a complete Linnean library. The president is Dr. Tycho Tullberg, a lineal descendant of Linné.

THE following are among the lecture arrangements at the Royal Institution before Easter:—Prof. J. A. Fleming, a course of six experimentally illustrated lectures, adapted to a juvenile auditory, on "Our Useful Servants: Magnetism and Electricity"; Prof. W. M. Flinders Petrie, three lectures on Palestine and Mesopotamia—discovery, past, and future; Prof. Arthur Keith, three lectures on the problems of British anthropology; Dr. Leonard Hill, two lectures on (1) the stifling of children's health, (2) the climatic adaptation of black and white men; Sir R. T. Glazebrook, two lectures on the National Physical Laboratory; Sir Napier Shaw, two lectures on illusions of the atmosphere; Prof. W. J. Pope, two lectures on the chemical action of light; M. Paul H. Loyson, two lectures on the ethics of the war; Sir J. J. Thomson, six lectures on problems in atomic structure. The Friday meetings will commence on January 18, when Sir James Dewar will deliver a discourse on studies on liquid films. Succeeding discourses will probably be given by Prof. J. Townsend, Prof. A. S. Eddington, Principal E. H. Griffiths, Prof. A. G. Green, Prof. E. H. Barton, and Sir J. J. Thomson.

IN the October issue of the *Agricultural Journal of India* (vol. xii., part iv.), Mr. Wynne Sayer discusses the present position of sugar manufacture and the measures required to place it upon a permanently sound basis. Notwithstanding the present high price of sugar, there is an actual decline in cane cultivation in India, notably in Bengal. Various reasons are propounded for the moribund state of the Indian white sugar industry, such as the predominance of low-grade varieties of cane, the popularity of unrefined sugar or *gur*, minute subdivision of the land, and the competition of crops, such as paddy, jute, and cotton; but it is urged that the greatest difficulties arise from the grossly inefficient manufacturing methods used. Where modern, well-managed factories exist, Indian sugar can be produced at a sufficiently low cost to compete with foreign sugar. Great improvements are also required in the *gur* industry, where inefficient methods commonly reduce the possible output by 35 to 50 per cent. Immediate action is urged with the view of placing both the *gur* and the white sugar industries on a satisfactory basis. The nomination of a strong committee of experts is suggested for the purpose of carrying out a survey of the sugar-producing areas and of considering the extent to which State assistance to the pioneer factories may be needed.

IN the September-October number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale* Prof. Marcel Brillouin discusses the question of the desirability of establishing in Paris a research and test laboratory for the musical instrument trade. He submits that any experiments carried out by individual firms have a value that is strictly limited to the manufacturers concerned. Further, such researches are not available to the majority. The laboratory which he now proposes should be created, at the common expense of all musical instrument makers, would comprise three sections: (1) Raw materials; (2) instrumental acoustics; and (3) testing and verifying. The laboratory would be staffed by a certain number of physicists qualified by their training to carry out the work satisfactorily. Section (1) would deal with the physical and mechanical properties of every raw material entering into the composition of pianos, and string, wood-wind, and wind instruments; section (2) would deal with researches in sound as applied to instruments, utilising the theories of Helmholtz, Rayleigh, Stokes, Gouy, Hugoniot, and others; while section (3) would consider methods of checking and testing instruments and their parts and implies the close co-operation of manufacturers. Hitherto German manufacturers—especially of pianofortes—have made very extended use of the results of Helmholtz and other authorities on sound, and it is claimed that the suggested new institution would go far, by utilising existing knowledge, to obtain empirical data which, in combination with the artistic (as applied to tone-quality) peculiarities of individual firms, could not fail to improve the quality of musical instruments in general.

THE death is announced, in the German Army Geological Service, of Prof. Fritz Daniel Frech, professor of geology and palæontology in the University of Breslau. Born in Berlin on March 17, 1861, Prof. Frech was educated in the University of that city, and graduated as Ph.D. in 1885. His thesis dealt with the coral-fauna of the Upper Devonian rocks of Germany, and he devoted his life to the study of fossil invertebrata, with special reference to their use in stratigraphical geology. For a few years he was engaged on the geological survey of Prussia, and among his early publications was an official memoir on the geology of Nassau (1888). In 1893 he was appointed successor of Prof. Ferdinand von Roemer in the University of Breslau, and he immediately began to direct most of his energies to the great compendium of stratigraphical geology which von Roemer had planned and just begun under the title "Lethæa Geognostica," following a similar work of earlier date by Bronn. Prof. Frech himself wrote the greater part of the section relating to Palæozoic formations and the whole of the volume describing the Trias, besides editing some sections of later parts of the treatise by other authors. So far as completed, this is the most exhaustive and useful work of reference on stratigraphical geology that has hitherto appeared, and is full of interesting generalisations based on broad views and wide experience. A few years ago Prof. Frech planned another important work of reference, a "Fossilium Catalogus," intended to comprise a systematic list of all known fossils, critically compiled with full quotations of literature by a series of specialists. He himself contributed the section on Devonian Ammonoidea and edited a few other sections, but, as publication did not begin until 1913, little progress has naturally been made. In 1913 Prof. Frech also succeeded Prof. Ernst Koken as one of the editors of the *Neues Jahrbuch für Mineralogie*. His energy was equalled by his ability, and geological science is distinctly the poorer by his loss.

THE contrast between Oriental and Western thought is well illustrated by a curious list, published in *The New East* (vol. i., No. 5), entitled "190 Things Japanese do differently." In Japan a man is free, woman carries the burdens; in the West "man acts as the packhorse for his lady." Japanese wear the thimble between the first and second joints of the middle finger of the right hand, Europeans on the tip of the middle finger; a Japanese tacks the kimono after, the European before, stitching. The Japanese mother-in-law is a terror to the bride; in Europe she is the husband's bugbear. The Japanese blow their noses with both hands; Europeans usually with one. The Japanese carpenter pulls at his saw; the European carpenter uses his triceps muscle rather than his biceps. Japanese take off their shoes, Europeans their headgear, on entering a house. Japanese say "four or three" where Westerns say "three or four"; and so on. If these facts were rearranged so as to exhibit the physical as well as the moral differences between Japan and Europe, the result might be of some scientific importance.

IN a lecture delivered at the Calcutta Museum, reported in the *Pioneer Mail* of September 1, Mr. Percy Brown discussed Indian artistic metal work. The most valuable specimens were executed in the medieval period of Indian history—that is, from the eighth to the eighteenth centuries A.D. Mr. Brown directed special attention to the copper colossus of Buddha found at Sultanganj, in the Bhagalpur district, Bihar. This figure is practically unique and almost unknown. It has been traced with some difficulty to a provincial museum in England. This statue of Buddha stands alone, as several centuries separate it from the other statues of the northern school, which are of the Vishnuvite Hindu type, and belong to the eleventh century A.D. Another admirable piece of work is a little shrine discovered at Dacca, and now in the Indian Museum. It is only 9 in. in height, but for richness of design and finish of workmanship it is the best specimen of this school. It represents Vishnu with the goddesses Sarasvati and Lakshmi, and his symbols, the wheel, mace, conch, and lotus. The figures of the goddesses with their graceful attitudes form an admirable foil to the dignified conventional image of the god.

THE new part of the Proceedings of the Prehistoric Society of East Anglia (vol. ii., part iii.) contains the usual profusion of beautiful drawings of flint implements and several noteworthy papers. Grime's Graves again receive much attention, and there is still a tendency to regard them as Palæolithic, but Mr. W. G. Clarke admits "that there is nothing in the knowledge available which actually precludes a Neolithic date for the Graves, and that there is a considerable amount of data concerning fauna and implements which supports that view." Mr. Henry Bury describes some interesting flat-faced palæoliths from Farnham, and discusses their possible relationship to the rostro-carinate implements of earlier date without any conclusive result. Mr. R. H. Chandler and Mr. J. Reid Moir contribute observations on the flaking of flints, and the latter author proposes that "flaking diagrams" of flint implements should be prepared to facilitate comparisons. Mr. R. A. Smith touches geological problems in his elaborate paper on plateau deposits and implements, showing the frequent difficulty of distinguishing between deposits formed by existing rivers and those due to an earlier distinct system of drainage. For students of man in the Stone age the number is indeed full of interest from all points of view.

THE present condition of the Quichuas of southern Bolivia is briefly, but ably, summarised by Mr. L. E. Miller in the *American Museum Journal* for October. These people represent a part of the wreckage of the ancient Incan Empire left by the Spanish invaders. Of the physical characters of this tribe nothing, unfortunately, is said, but to the ethnologist this account will be most welcome. In the upper reaches of the Pilcomayo the Quichuas are still to be found in almost their primitive simplicity, both in the matter of customs and of dress. In the latter particular, indeed, they seem to have changed but little since the days of Atahualpa. No jewelry or ornaments of any kind seem to be worn, save huge, spoon-shaped pins of copper, used by the women to fasten their shawls. The llama, once their chief source of food and clothing, is now being replaced by sheep and goats. But the llama is still used as a beast of burden, and blankets of superb quality are still made of its wool. Unfortunately, the yoke of the Spaniard still presses heavily on these wretched people, and the author gives instances of the treatment they have to bear with what equanimity they may, for no redress is theirs.

THE directors of the Wistar Institute, Philadelphia, have initiated a bibliographic service which will prove to be a great saving in time and trouble to all biologists. At the present time the leading biological journals of the United States—the *Journal of Morphology, Journal of Comparative Neurology, American Journal of Anatomy, Anatomical Record,* and *Journal of Experimental Zoology*—are managed and issued by the Wistar Institute. For the sum of three dollars per annum the directors of that institute undertake to supply index-cards, which, when filed, will serve as a subject index and an author index to all publications appearing in their journals. An outstanding feature of the scheme is the abstract of each paper, which is printed on the back of the author index-card.

THE first number of the new *Journal of Urology* (Baltimore, Ind., U.S.A.; London: Cambridge University Press) has reached us. Its object is the publication of original papers on the physiology, pathology, and surgery of the urinary tract. It is published in the United States of America under the editorship of Dr. Hugh Hampton Young. The contents of the number before us are of a high order of excellence, and include such topics as the surgery of the ureters, the cultivation of tumours *in vitro,* the physiology of the ureter and vas deferens, the effect of the intravenous injection of various substances on the composition of the blood and urine, and on nitrogen metabolism. There can be no question as to its usefulness to those engaged in the special branch of medical practice with which it is concerned; but, at the same time, some doubt may arise as to the wisdom of the publication of papers on more general questions, such as nitrogen metabolism, presumbly because certain products of this chemical activity are excreted in the urine. It would seem that such questions as these belong more appropriately to the less special journals. A useful addition to the *Journal of Urology* would be a section devoted to the giving of the titles, and perhaps abstracts, of papers which bear on the special province of that journal, although they appear in other periodicals. There must be many such papers. The new journal is of attractive appearance and well illustrated.

THE *Comptes rendus des travaux du Laboratoire de Carlsberg* (1917, vol. ii., part 6) contains an important article by Prof. A. Klocker on the preservation of fermentation organisms in nutrient media. Hansen's conclusion that a 10 per cent. solution of cane-sugar forms an excellent medium is confirmed, but beer wort is also very good. The Pasteur flask is undoubtedly the best form of vessel for prolonged preservation. The present observations were made, during a period of more than thirty years, on 820 cultures of yeasts and moulds. These included Saccharomycetes, Schizosaccharomycetes, Torulæ, Mycoderma, Endomyces, Monilia, Chalara, Oidium, and Mucor. For the most part the nutrient medium employed was a 10 per cent. solution of cane-sugar, in which 461 cultures were grown, but 290 cultures were made on beer wort and sixty-nine on other media. Of the 461 cultures on cane-sugar solution (231 of these being Saccharomyces) 403 survived, whilst 58 perished. In the case of the 290 cultures grown on beer wort (190 Saccharomyces) 268 survived and 22 perished. Thus it must be concluded that fermentation organisms can be kept alive for upwards of thirty years. The exceptions to this rule are:—(1) The asporogenic varieties of Saccharomyces; (2) *Saccharomycodes Ludwigii*; (3) Schizosaccharomyces; and (4) *Aspergillus glaucus*. Of the first only 44 per cent. survived on cane-sugar and 21 per cent. on beer wort, of the second only one in nine survived on cane-sugar for more than 7·5 years, but all five cultures on beer wort survived for twenty-five years. Only two out of five cultures of Schizosaccharomyces on cane-sugar survived, but ten out of eleven of those on beer wort were living. Of six cultures of *A. glaucus* only one survived, and two of the remaining five perished in less than two years.

THE first annual report of the Zoological Survey of India, a new and promising transformation of the Indian Museum Cinderella, contains a great deal of interesting information. New ground was broken in the Shan States, where the director of the survey, Dr. Annandale, personally superintended a survey of Lake Inlé. The basin of this lake is stated to have been formed by solution, in limestone rock, and to be filling up with silt and aquatic vegetation; the water is shallow and of extraordinary limpidity; floating islands are a notable feature; fishes of many new species were discovered, for three of which new generic definitions are necessary, among them a minute eel so peculiar as to require seclusion in a new family; the molluscs are scarcely less remarkable, and among them occurred a group of pond-snails interesting not only for the bizarre shape and bright colour of their shells, but also because an almost complete series of forms transitional between them and nearly normal forms was found in other parts of the lake, in other neighbouring waters, and fossil in the surrounding country. Mr. Kemp, superintendent in the survey, investigated the Mutlah channel of the Gangetic delta; this is a deep and permanent channel, and its waters, which are never very salt, are heavily charged with silt; a remarkable feature of its fauna is said to be the extraordinary resemblance of some of its fishes and crustacea to deep-sea forms, in colouring, in gelatinous translucency, and in filamentous feeler-like appendages. Dr. Chaudhuri, an assistant-superintendent in the Survey, paid a visit to certain large tanks in Seringapatam, where a century ago Buchanan-Hamilton obtained several species of fishes that have never since been brought to light; Dr. Chaudhuri was successful in rediscovering some of them. A feature of the report, as an official departmental publication, are the excellent illustrations.

MR. A. M. HERON (Mem. Geol. Surv. India, vol. xlv., part i., 1917, price 4*s*.) describes the results of a re-survey of north-eastern Rajputana, where the Archæan Alwar quartzites run south from Delhi and form hills with remarkably level crests. Some revision of the stratigraphical sequence is proposed; an "arkose" series is shown to be in reality a granite intrusive in the Delhi system; and the planing of the Alwar crests is interestingly ascribed to subaerial action going back to the Jurassic period. The deepening of stream-beds among dissected sandhills seems to point to a diminution of aridity in Rajputana.

AN elaborate memoir on "The Origin of Dolomite," by Francis M. van Tuyl, appears in the annual report of the Iowa Geological Survey for 1914 (1916), and would be important merely on account of its references to previous work. The author concludes that "the great majority of the stratified dolomites have had their inception in the alteration of limestones." He is unable to accept Klement's work at high temperatures, or Pfaff's at high pressures, as bearing on the natural problem, but agrees with Steidtmann and Wallace (see NATURE, vol. xciv., p. 459) that greater concentration of salts in the sea-water has much to do with dolomitisation of limestone already laid down. Illustrations are given from North American geology.

THE depredations of the boll weevil on the American cotton crop in recent years have led to the replacement of cotton-growing in large areas by the cultivation of groundnuts (*Arachis hypogaea*). According to *Agriculture* of March last, the value of the groundnut crop in the United States has increased in the eight years from 1908 to 1916 from twelve million to fifty-six million dollars. It has been found that by slight adjustments of machinery cotton-seed mills can be used for crushing groundnuts. An increasing proportion of the crop, however, is being utilised for food purposes in the uncrushed state. Efforts are being made by the Government to discover the best use for the groundnut and to popularise it with American kitchens, and experiments in progress under the auspices of the Chemistry Bureau of the Department of Agriculture are said to promise the production from groundnut meal of a bread equal in nutritive value and palatability to wheaten bread.

SCIENTIFIC PAPER 301 of the Bureau of Standards describes a calorimeter devised by Mr. N. S. Osborne, of the Bureau, for the determination of the specific heats and latent heats of evaporation of materials used in refrigerating machines, *e.g.* ammonia, carbon dioxide, sulphur dioxide, methyl and ethyl chlorides. Ammonia has already been investigated over the temperature range −40° C. to 40° C.; the other substances are to be dealt with and the results published later. The calorimeter is of thin steel, about 4 cm. in diameter and 10 cm. long, with a central electric-heating coil. It is enclosed in a steel jacket capable of withstanding a considerable pressure. The temperature of the calorimeter is measured by means of a platinum thermometer, and the jacket is maintained at the same temperature as the calorimeter to diminish heat losses. The measurements already made show that an accuracy of one part in a thousand can be secured.

THE difficulty of getting coloured lines in exact juxtaposition and of sufficient fineness for the purposes of colour photography has, according to *La Nature* for November 10, been completely overcome by M. Louis Dufay, who is associated with the brothers Lumière. The method is to pass a thin celluloid film between two rollers warmed sufficiently to render the celluloid plastic. One of the rollers has very fine circumferential parallel grooves of square section cut upon its surface, and thus the celluloid has similar grooves formed upon it. The film is then coated with a coloured transparent fatty mixture and wiped off after the manner of wiping an etched plate after inking and before taking an impression from it. The film is next treated with an alcoholic solution of another colour, and this penetrates the exposed surface of the celluloid. Thus there are formed alternating coloured lines in perfect juxtaposition, which may be of a fineness as great as thirty lines to the millimetre. If the film is thin enough to permit it without introducing the possibility of parallax, the other side of it may be similarly treated, either simultaneously or afterwards, so that two other colours may be introduced, or these may be added in the form of any microscopic figures that may be preferred. Three double pairs of colours are given: (1) yellow and blue, red and green; (2) yellow and red, blue and orange; (3) red and blue, yellow and violet.

ATTENTION may be directed to a useful collection of data respecting the absorption of atmospheric gases by water, given in a paper contributed by Mr. J. H. Coste to the Journal of the Society of Chemical Industry for August 15. As regards the significance of the gases dissolved in natural waters, the conclusion is that water freely exposed to the air should, and does, contain the proportion of gases of the air corresponding with the temperature and saline content of the water, provided these have not been recently changed. In respect of oxygen, all the ascertained facts show that if water is found to contain very much less of this gas than the saturation-value for the particular temperature in question, a strong presumption is raised that the water contains matter undergoing oxidation. Since, however, the water may have recently fallen in temperature, the deficiency of oxygen may be only an apparent one, due to the fact that equilibrium between the atmospheric gases and the dissolved gases has not yet been established under the new conditions. In such cases, therefore, the point can only be settled definitely by determining the nitrogen—the constituent which, so far as is known, is not taken up chemically by anything in the water. It appears that slow non-tidal streams will give unpleasant signs of the presence of decaying matter at much higher degrees of aeration than deep streams with strong tidal currents. This is probably due to a variety of causes, such as slowness of downward diffusion in the less rapid streams, and the accumulation of undisturbed mud which, in fermenting, gives off gases that have but little opportunity of being absorbed in their passage upward through the layer of relatively still and shallow water of the slow non-tidal streams. No fewer than seventy-six references are included in the bibliography of the subject given by the author.

The Engineering Experiment Station of the University of Illinois has published a brief report upon experiments on the utilisation of pyrites occurring in Illinois bituminous coal, drawn up by Mr. E. A. Holbrook. It appears that some of the Illinois coal seams contain bands, nodules, or lenses of pyrites in considerable quantity; these are for the most part thrown out in the course of getting the coal, and thrown back into the goaf, whilst others are picked out at the surface. The proportion of pyrites in the coal refuse varies from 7½ to more than 40 per cent., and whilst it carries too much carbonaceous matter and too little sulphur to be available for sulphuric acid manufacture without treatment, it is shown by these experiments that by simple crushing, screening, and dressing by means of jigs and tables, it is easy to get a product with 40 to 45 per cent. of sulphur, with a recovery of 80 per cent. of the pyrites present. Details are given of the plant proposed for this purpose and of its first cost, whilst an estimate of the cost of operating a plant capable of treating 50 tons of crude pyrites in eight hours shows a very reasonable working profit. It is interesting to find that the possibility of recovering and utilising this hitherto waste material is attracting attention.

The latest catalogue of Mr. F. Edwards, 83 High Street, Marylebone, W.1 (No. 379, "Drama and Dramatic Art"), is not of very especial interest to readers of Nature, but attention may be directed to the following volumes on North American Indian tribal customs:—"The 'Hako,' a Pawnee Ceremony," A. C. Fletcher; "The Mountain Chant, a Navajo Ceremony," Matthews; "The Sioux Outbreak of 1890 and Ghost Dance Religion," Mooney; "Ceremonial of Haszelti Dailjis and Mythical Sand Painting of the Navajo Indians," Stevenson; "Tusayan Flute and Snake Ceremonies" and "Tusayan Snake Ceremonies," Fewkes; "The Zuni Indians; their Mythology, Esoteric Societies, and Ceremonies," M. C. Stevenson.

Sir William Tilden has just completed his life of the late Sir William Ramsay, and placed it in the hands of Messrs. Macmillan and Co. for publication.

OUR ASTRONOMICAL COLUMN.

Fall of a Meteorite in Perthshire.—On December 3, at 1.15, what is stated to be a meteorite struck the lodge at Keithick House, Coupar Angus, which is about twelve miles N.E. from Perth. In the Blairgowrie, Coupar Angus, and Strathmore districts a noise was heard resembling a peal of thunder, and at places more remote sounds as of a distant explosion were audible. The meteorite has been taken to Perth for proper examination and analysis. It appears to have been well seen by an observer at Edinburgh during its flight. The time was 1.10 p.m., and the object descended at an inclination of about 12° from the vertical to the left, and disappeared in about azimuth 4° W. of N., at an estimated altitude of 30°. This agrees very nearly with the required direction of a body falling at Coupar Angus, which is in slightly W. azimuth from Edinburgh.

Further information shows that three fragments of the meteorite have been found, weighing 22¼ lb. (which penetrated the ground to a depth of 20 in.), 2½ lb. (which entered the roof at Keithick Lodge, Coupar Angus), and 2¼ lb. (found in a field at Carse Farm, near Blairgowrie, 6 in. below the surface). These pieces were distributed over a distance of six miles in a S.E. to N.W. direction, and sufficiently prove the direction of the meteor's motion.

From the various observations, now about twelve in number, of the luminous flight of the meteorite, it appears probable that its radiant point was in about $302^\circ + 24^\circ$. This position would correspond in direction with the line of the fallen fragments from Keithick to Essendy. The meteor seems to have passed over the Firth of Tay, about four miles S.W. of Dundee, and at a height of twenty-five miles, and to have entered over the Scotch coast from the North Sea near Fife Ness, but it is hoped that further observations will enable more certain and exact conclusions to be obtained.

A large number of persons witnessed the luminous flight of the object, and are sending to Mr. W. F. Denning observations from which it is hoped to compute the real path. The meteor was strikingly brilliant, though the sun shone at the time.

Observations of Long-period Variables.—A valuable series of recent observations of twelve long-period variable stars is recorded by M. Luizet, of the Lyons Observatory, in the *Journal des Observateurs*, vol. ii., No. 2. Some of the results are collected in the following table:—

Star	No. of maxima observed	No. of minima observed	Mags. at maxima	Mags. at minima	Period in days
SS Draconis	9	10	8·6–9·1	9·3–9·5	48·2
V Urs Min.	14	11	7·8–8·2	8·3–9·1	72·1
RR Boötis	6	1	8·2–9·5	12·6–12·8	194·0
AF Cygni	6	2	6·8	8·0	96·8
UU Draconis	9	8	8·8	10·1	Irregular
SV Cassiopeiæ	1	1	7·3–8·4	9·1–10·1	279·4

The other stars observed were UV Draconis, V Aquilæ, SS Cygni, X Herculis, TZ Cassiopeiæ, and V Cephei.

Messier's Catalogue of Clusters and Nebulæ. In *L'Astronomie* for November, M. Camille Flammarion gives the first instalment of a systematic review of the 103 clusters and nebulæ which were included by Messier in the earliest catalogue of such objects which was compiled. M. Flammarion relates how he came into possession of Messier's manuscript, containing detailed remarks on each observation, through good fortune at a second-hand bookstall, and he is thereby enabled to give the original account of each object. Observations commenced by M. Flammarion forty years ago, and afterwards continued with the collaboration of M.